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- COMMUNIST CHINA -

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FULL UTILIZATION OF COTTON AND KAOLIANG STALKS

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[The following is a translation of an article submitted by the Light Industry Planning Bureau, State Planning Commission, in Chi-hua yu T'ung-chi (Planning and Statistics), Peiping, No. 5, 23 May 1960, pp 22-23.]

I. Comprehensive Utilization of Cotton Stalks

Under the brilliance of the general line, the work of the full utilization of cotton stalks has achieved great development within the last few years. In 1958, the production of cotton stalk pulp was about 1,000 tons. The utilization of unpeeled or peeled stalks to produce fiber board, paper board and cultural wrapping paper has also been successful. In 1958-59, China fleeced 1,400,000 tan of cotton fuzz, accounting for 40% of the total fuzz resources. In 1959, cotton stalk peels were used in the increased production of 4,000,000 gunny sacks.

In 1959-60, at the 8th Plenary Meeting of the 8th Central Committee, the spirit of the anti-rightist movement encouraged the people in all areas to make full use of cotton stalks and they have attained new development. Besides making a greater utilization of cotton stalk peels, there was further progress in the use of peeled cotton stalks and the water extract from the cotton stalks. New discoveries in the utilization of cotton pods, have also been made.

(1) The weight of different elements and chemical properties of dried cotton stalks:

According to investigation and tests, the total weight of dried cotton stalks per mou is 540 chin. The weight of each element and its percentage to the total weight are: leaves 100 chin, 18.5%; peels 40 chin

7.4%; stalks 120 chin, 22.2%; cotton pods 80 chin, 14.8%; cotton seeds 120 chin, 22.2%; cotton fibers 60 chin, 11.1% [weights do not total 540; percentages do not total 100]. The chemical properties of each cotton stalk: water 12.46, carbon 9.74, citrus extract 3.51, protein 3.14 molasses 20.96, ligneous constituents 23.16, and cellulose 47.26.

(2) Cotton stalk peel cellulose:

The cotton stalk peels, after a chemical or natural extraction process, the citrus extract, the ligneous constituents and other impurities having been eliminated, have only cellulose left, which can be made into gunny sacks, linens, and hemp ropes. In Szechwan, the natural extraction process has been used and an excellent cotton stalk peel cellulose, equivalent to jute, has been attained. It is being used to make textile goods, sacks and other fabrics. Because the people welcome it, its supply cannot meet the demand.

Each mou of cotton field can produce 40 chin of cotton stalk peels. After citrus extract has been eliminated, 13 chin of cellulose can be obtained and with this amount of cellulose, 6 gunny sacks can be produced. China has 90,000,000 mou of cotton fields under cultivation. If 50% of this area were utilized, 5,850,000 tan of cotton stalk peel cellulose could be obtained, an amount sufficient for 292,000,000 gunny sacks.

(3) Utilization of the water extract from cotton stalk peels to attain oxalic acid:

Utilizing the water extract from the cotton stalk peels, put this waste water through two processes of filtration to eliminate the impurities. Then, add 0.5-0.6% sulphuric acid into a hydrolysis treatment, after which an extract of frozen residue appears. Again, add 1% soda ash to the residue and the result is oxalic sodium sulfite. To this, add some ammonia water, lime water, and 6-7 chin ammonium-oxide. The result is oxalic ammonium. It contains oxalic acid, which is a stimulant to plant growth. It may be used to activate fertilizers, or used as a basic fertilizer or as a spray on leaves. One chin of this acid is sufficient for one cultivated mou. The acid must be diluted with 1,800-2,000 chin of water. Four days after its application, plant growth will show marked

effect. It is especially good for the growth of persimmons, potatoes, and beets. It has equally good effects on rice and wheat growth, whose output has been increased by 10-20%.

It not only stimulates plant growth but also strengthens the roots, stems, and the leaves. It helps the plants to absorb more nourishment, enabling all agricultural crops to have longer roots, stronger stalks, better fruits and resistance to easy bending. In 1959, the Fei-ma [Flying Horse] People's Commune, San-t'ai Hsien, Szechwan, utilized the water extract from the cotton stalk peels to make 20,000 chin of oxalic acid, which was valued at 8,000 yuan.

(4) Utilization of the cotton stalks:

Cotton stalks are good materials for paper-making. Results of tests have shown that if cotton stalks are put through a proper mechanical preliminary treatment, they not only can be made into cement bags but also into cultural paper, insulation paper, telephone paper, sprout nourishing paper, and other important industrial papers. It is economical to use cotton stalks to make paper because its production cost is low.

For instance, the cost of making cement paper bags, by the sulphate process, is 421 yuan per ton and by the soda process, 278 yuan per ton. In addition, cotton stalks can substitute for timber in the production of fiber board. If cotton stalks are burned, their ashes are of such quality that they are suitable to be used in making gun powder. This helps the country to save a great quantity of timber.

(5) Extract oil from cotton pods and use cotton bagasse for feed:

Cotton pods contain 9.8% oil. In Hopeh, the Kao-ch'eng Hsien Ch'eng-kuan Commune's Mao-chuang United Brigade and the Shu-lu Hsien Huai-shu Commune's Huai-shu Production Brigade have succeeded in extracting oil from cotton pods. Their oil extraction operation is as follows: fry the pods first into a semi-brown color, then crush them into powder, which is to be steamed thoroughly. Following this, put the cooked mixture into rings, which are put into a press. According to statistics, for every 100 chin cotton pods, 15 chin crude oil (the amount of pure oil is being tested) can be extracted, and 130 chin of cotton bagasse. In the beginning of 1960, the Shu-lu Hsien Huai-shu Commune

has extracted 120,000 chin of oil from the cotton stalks of 32,000 mou of cotton fields. It has made use a portion of this oil and turned it into 25,000 bars of soap (cotton pod oil 80%, bone oil 20%, and 30% caustic soda). This not only supplies agricultural soap for a whole year but also provides lubricating oil for the machines. Furthermore, the cotton bagasse is sufficient to supply the hogs with feed.

(6) Value of all cotton stalks after comprehensive utilization:

In 1960, China has a total cotton cultivation area of about 90,000,000 mou, which could yield about 21,600,000,000 chin of cotton stalks. If all the stalks could be comprehensively utilized, the quantity and value of the products that could be produced from these stalks would be enormous; it would also have a great economic meaning.

According to calculations, each mou of cultivated cotton field can produce 240 chin of cotton stalks, of which stalks amount to 160 chin (peels 40 chin and peeled stalks, 120 chin) and cotton pods 80 chin. Each mou also produces 13 chin of cellulose. The total amount of cellulose from 90,000,000 mou could amount to 11,700,000 tan, which can be made into 585,000,000 gunny sacks, worth 1,052,000,000 yuan.

From the cotton stalk peels, oxalic acid can be produced amounting to 540,000,000 chin, worth 216,000,000 yuan. Cotton pods totalling 7,200,000,000 chin will give an oil extract of 1,080,000,000 chin, valued at 216,000,000 yuan. There could be cotton bagasse of some 940,000,000 chin, valued at 188,000,000 yuan and which could feed 4,700,000 hogs. There also could be 5,400,000 tons of cotton stalk fiber board, paper and paper board, estimated at 1,620,000,000 yuan (average price of 300 yuan per ton).

The above 5 items of estimation give a total of 3,292,000,000 yuan, which means that the average income per mou of cotton can be increased 36.5 yuan. Through comprehensive utilization, the useless cotton stalks become useful. It increases the wealth of the country. It opens a new source of raw materials for the light textile industries. Therefore, comprehensive utilization of cotton stalks becomes a promising enterprise. Attention must be given to this new enterprise,

by assisting it and promoting it so that it will attain greater developments.

II. Comprehensive Utilization of Kaoliang Stalks

Kaoliang not only is a high yield food crop but it is also an economic product having characteristics that render its comprehensive utilization to be of rather high economic value. Kaoliang stalks contain 8-12% sugar. They are good materials for sugar-making, alcohol-distilling, and paper-making. Kaoliang leaves can be used as feeds directly. In 1959, fourteen provinces and cities in China cultivated more than 5 million mou of kaoliang. Just in the province of Hopeh alone, there were 3,370,000 mou. The average production per mou was over 300 chin, which was 25-50% higher than the ordinary kaoliang production. The average per mou production in Shensi Province was over 500 chin, that of Hopeh Chang-li Hsien Pe-hai Commune was 580 chin, that of a few experimental farms was over 1,000 chin. Based on the average per mou production of 300 chin, each mou of kaoliang can produce 2,000 chin of stalks and 550 chin of leaves. In the past, kaoliang stalks were used only as feeds, fuel, and for hut-building materials. To be used as a fuel, kaoliang stalks containing sugar, have great dampness, cannot be dried easily and do not make a good fuel. To be used as a building material, kaoliang stalks rot easily and become a nest for insects. Thus, it is best to use kaoliang stalks to make sugar and paper.

Since 1959, kaoliang stalk comprehensive utilization has been widely promoted in the provinces of Hopeh, Shantung, Honan and Kiangsu. Especially in Hopeh, the movement has been more thoroughly promoted and has advanced from the hsien down to the communes and again to the working teams, so much so that is has become a mass movement.

According to statistics from five hsien and cities in Hopeh, the 1959's movement for comprehensive utilization of kaoliang stalks has resulted in the establishment of over 1,000 small sugar mills, 300 alcohol distilleries, and 48 paper mills. Over 8 million workers participated in the movement. They have produced from

kaoliang stalks: syrup 3,230,000 chin; brown sugar 115,000 chin; white alcohol 2,890,000 chin; paper and pulp 6,380,000 chin; and by-products (soy, etc), 4,470,000 chin. By the middle of November 1959, the Liao-cheng Special District in Shantung Province, has produced: brown sugar 8,000 chin; syrup 260,000 chin; alcohol 670,000 chin; vinegar 60,000 chin. They have created 300,000 yuan of national wealth and increased the income of the commune members by 450,000 yuan.

In the comprehensive utilization of kaoliang stalks, 8-12 chin of syrup can be obtained from every 100 chin of kaoliang stalks. This syrup can be used directly in the food processing industries, such as in the baking of cakes, preserving fruits, curing dried fruits, and making jam. The production cost of syrup is 0.18-0.19 yuan/chin. From every 100 chin of kaoliang stalks, the following can be produced: brown sugar 4-5 chin; syrup 6 chin; and bagasse for pulp 10 chin. If kaoliang stalks are used to distill alcohol, from every 100 chin of stalks, 7-10 chin of alcohol can be produced. Under comprehensive utilization operations, the income per mou is 140-160 yuan, which is 60% more than its original income.

Kaoliang's time of growth is relatively short (about 4 months) and it ripens early. It is 20-30 days ahead of the common variety of kaoliang. Generally, kaoliang is harvested in the middle or latter part of August. Only the seeds are reaped, leaving the stems in the field, where they continue to grow, as sugar cane does in the southern part of the country. When kaoliang is needed for the production of sugar, it is then cut from the field. In this manner, sugar is preserved in the stems rather than being lost in the cut-off stalks while being dried. From the time of reaping the seeds to the coming of frost, there are about three months time for the stems to continue to grow, while waiting for sugar production. At the present, experiments are being carried out to seek a method to store the raw materials. If these experiments are successful, the production period can be prolonged.

The production of sugar and alcohol from kaoliang stalks needs very simple production equipments and simple techniques. The production method in this case is similar to that in beet-sugar production. Because kaoliang can be harvested 2 months ahead of the beet

crop, the equipment in the beet sugar plants can be used during these 2 months to process kaoliang stalks for sugar and to process the beets when they are harvested later. This increases the usage of equipments where there are beet sugar plants.

The comprehensive utilization of kaoliang stalks to produce sugar, alcohol and paper has opened up a new and important source of raw materials for industries. It involves no competition between the growing of economic products and the raising of food products. It increases national wealth, increases the capital accumulation of the communes, and raises the income of the commune members.

In 1960, the kaoliang cultivation areas in the whole country will be greatly developed. On account of this, methods of comprehensive utilization must be widely publicized, and early preparations must be made, and the full economic value of this product must be completely utilized. On the one hand, when kaoliang cultivation areas are planned, consideration must be given to the central location, where all products can be conveniently assembled, and to the adequacy of transportation so that production operations will be facilitated. At the same time, attention must be given to the selection of good seeds, so that the quantity and quality of kaoliang output may not be lowered and the sugar content in the kaoliang stalks may not be reduced.

On the other hand, production must be on the commune or the production team basis. The workers must be selected from the local area and they must use native methods. Give the workers a good technical training and make preparations well in advance to welcome the high peak of production under the comprehensive utilization method in the autumn. Under comprehensive utilization, it is advisable to have sugar production as the main operation. According to present technical equipment, it is best suited to produce syrup. In areas where equipment is better, brown sugar should be produced.

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Small units in geology departments are many. Their mobility is great and their working areas are scattered. Some of them cover areas ranging from a few districts to as large as a few provinces. Further complicated by group formations and disbanding and by poor communications, there are many difficulties in investigation and assistance by the higher levels of Party Committees and political leaders. For this reason, during the many political movements in the past it was easy for some of the units to be left out or neglected, or to not receive thorough effects of the movements.

The provincial geological bureaus (offices) must take into consideration the characteristics of general exploration, prospecting and evaluation, as well as other different specialized forces and the seasonal character of their work. On the basis of this they must submit suggestions to the different levels of Party committees on rectification plans for individual field teams. We must make sure that during this rectification movement not a single unit or a single person is left out.

Furthermore, from the beginning to the end of rectification movements, we must conscientiously persist in doing well so that everyone will receive an excellent training through political and ideological struggles in socialist revolution. We believe that as long as we can intensively carry out the rectification and socialist education movements, thoroughly defeat the attacks of rightist elements, determinedly correct bureaucratism, subjectivism and factionalism in leadership attitudes, and conquer the different anti-proletariat ideas among the masses of staff and workers, we shall be able to raise a step higher the technical and management levels of the geological departments and complete our 1958 geological prospecting plan by producing more of higher quality with greater speed and increased frugality.

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